TOTAL SYSTEM DEVELOPMENT

MILESTONES

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1. GENERAL

1.01 The purpose of this section is to establish a set of system development milestones based on completion of the phases of the Total System Development (TSD) process. Milestones are necessary for the planning, organizing, and controlling of information systems work from a corporate perspective.

1.02 Whenever this section is reissued, the reason(s) for reissue will be in this paragraph.

1.03 This section is issued as a guideline. The milestones that are described in this section can be applied by any Bell System entity responsible for the development of information systems. This may include centrally-developed as well as locally-developed systems.

1.04 This section is one of a series of sections related to the Total System Development process. Other sections are:

SECTION	TITLE
007-200-200*	Glossary of System Development Terms and Acronyms
007-208-310	Project Management
007-220-301*	TSD Proposal Phase Guidelines (Proposal through Performance Review)

* Check Divisional Index 007 for availability.

2. TOTAL SYSTEM DEVELOPMENT CONCEPTS

2.01 Total System Development is a term used to describe a disciplined approach to building systems. It is a common sense approach which is intended to be used in conjunction with technical expertise and management judgment.

2.02 Total System Development is a phased approach with observable products specified for

* Check Divisional Index 007 for availability.

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completion at predictable points (end-of-phase milestones) during the development effort. Thus, the use of TSD facilitates the planning and control of the system development process. Problems with the system under development can be identified, escalated, and resolved before large expenditures have been committed to the system.

2.03 The purpose of any system is to satisfy business goals and user needs. To assure this, user participation in the specification of system objectives and involvement in the design review process are an important part of TSD. Once installed, the system is evaluated to assure that user needs are met and projected benefits to the business are attained. Thus, throughout TSD, the acceptability and usefulness of the system (from the user's point of view) is of primary importance.

2.04 The computer subsystem (CSS) of an information system consists of the system hardware (machines) and the software to operate it. The personnel subsystem (PSS) consists of the procedures, work stations, training, etc, for the people who operate and use the system. The PSS is the most visible part of the system to the users. However, it is frequently ignored or deferred until after the CSS design is complete. Total System Development emphasizes the need throughout the system development effort for appropriate attention to ***both*** the computer and the personnel subsystems.

2.05 In the early analysis phases of TSD, emphasis is placed on identifying the environment in which the system will operate. This facilitates the integration of the system into appropriate corporate plans, including interconnection with other systems.

2.06 Total System Development provides for early identification of system data requirements, design of system data, and data bases so that data is effectively secured and handled as a corporate resource.

2.07 Total System Development activities include the design of system controls and the completion of progressive developmental testing to ensure that the system will perform as designed to meet its specified objectives.

2.08 Total System Development activities are compatible with many related technologies such as structured analysis, design and testing, structured walk-throughs, on-line documentation schemes, mechanized project management techniques, etc.

2.09 Total System Development can be used for developmental efforts of any size or type. However, activities, documentation, and milestone review requirements may need to be modified depending on variables such as potential system impact, developmental resource expenditures, and development duration.

2.10 The benefits are maximized when it is utilized in parallel with effective project management techniques for planning, organizing, and controlling system development projects and when corporate project approval and control functions are in place. Section 007-208-310, Project Management, recommends project planning, organizing, and controlling techniques to be used with TSD.

3. TOTAL SYSTEM DEVELOPMENT MILESTONES

3.01 The activities of TSD have been combined into eight phases. The end of the TSD phases are milestones which trigger the following activities:

(a) Project approval, including reevaluation of project worth

(b) User and/or technical review

(c) Development team member changes (based on changing expertise requirements as development progresses).

3.02 The activities in all eight phases are required to complete a system development effort. However, depending on a project's impact, type, size, and required resources, the Project Manager, in consultation with the development agency (if one has been selected), may select a smaller set of the TSD phase milestones as the basis for formal tracking and reporting (ie, some of the phases may be combined). This selection of formal milestones would be made during the Feasibility Phase as part of an overall project strategy. The milestones selected must be compatible with approval requirements and must have the concurrence of approval bodies and system users.

3.03 ***Proposal Phase Milestone:*** In this first phase of TSD, an organization identifies and documents a problem or opportunity which requires

mechanization or documents a need to enhance, modify, or upgrade a current system. Information available at the Proposal Phase milestone would be:

(a) The impact of the current situation (on earnings, effectiveness, service, controls, etc)

(b) The nature and scope of the proposed mechanization effort

(c) The desired benefits of a new system

(d) The estimated cost of a new system

(e) The relationship of a new system to the organization's long-range plans.

3.04 ***Feasibility Phase Milestone:*** This phase is concerned with transforming broad problem/opportunity statements into the objectives and performance specifications to be met by a system. Alternative solutions (system models) are developed and then examined to determine the economic, technical, and operational feasibility of each solution. The best system model is described. Information available at the Feasibility Phase milestone would be:

(a) An analysis of the current organizational environment and functions performed

(b) A detailed description of problems and opportunities

(c) A description of the system users' needs

(d) Alternative system models (including the system objectives, business objectives, system outputs, inputs, data, functions, conversion considerations, and user impact for each model)

(e) A cost/benefit analysis of the alternative system models including recommendations.

3.05 ***Definition Phase Milestone:*** In this phase, all the system requirements are detailed. That is, the description is completed as to what the system will have to do to meet the objectives developed during the Feasibility Phase. Information available at the Definition Phase milestone would be:

(a) A detailed definition of the system output, input, and data requirements

(b) A description of the system functions

(c) A description of the data conversion considerations

(d) A description of the system control and reliability requirements.

3.06 ***Preliminary Design Phase Milestone:*** This is the phase in which the logical architecture of the system is designed. System processes are examined to determine which should be performed by people and which are to allocated to the computer and related software. Some of the products available at the Preliminary Design Phase milestone are:

(a) An evaluation of system architectural options

(b) The CSS and PSS subsystem function structure

(c) The system structure

(d) A logical view of data requirements

(e) The test and conversion strategies

(f) Descriptions of requirements for personnel, equipment, facilities, communication network, etc.

3.07 ***Detail Design Phase Milestone:*** During this phase, the designs of the PSS and CSS including the human/machine interfaces are completed concurrently, and the physical design specifications are prepared. Some of the products available at the Detail Design Phase milestone are:

(a) The design of the manual procedures

(b) The design of the program logic

(c) The physical design of the data base, records, and files

(d) The communications network specifications

(e) The equipment and facilities specifications

(f) The hardware and software specifications

(g) The training specifications.

3.08 ***Implementation Phase Milestone:*** Implementation is the phase in which the system

is constructed according to the design specifications produced in the Detail Design Phase, and then, fully tested to ensure that it meets the system requirements established in the Definition Phase. Some of the products available at the Implementation Phase milestone are:

(a) The PSS documentation including administrative, user, and training materials

(b) The coded programs

(c) The CSS documentation

(d) The system verification and validation testing results

(e) The initial service agreement (operating agreement).

3.09 ***Conversion Phase Milestone:*** In the Conversion Phase, records are created or converted to new forms, system personnel are trained, and the new system is installed under actual operating conditions. If the new system is replacing an existing one, the old system is phased out and the new system is phased in. Some of the activities completed by the Conversion Phase milestone are:

(a) Conversion of the data

(b) Installation of the hardware, software, and facilities

(c) Orientation and training of user and operations personnel

(d) Conversion and/or installation of PSS work modules

(e) System certification (acceptance) testing

(f) Development of the completion agreement.

3.10 ***Performance Review Phase Milestone:*** The Performance Review Phase is performed after the system has been operational for several months. If the system is to be installed in multiple locations (by a Central Developer or an Operating Company), the Performance Review is usually conducted only for the ***trial*** location. If the trial location is in any way atypical, the second installation (or the first and second together) may be used for the Performance Review. The phase involves collection and analysis of data about the system performance, the user attitude toward the system, the effectiveness of the development effort itself, and proposed maintenance or enhancement items. A report on the results of the review will be available at the Performance Review milestone.

4. SYSTEM DOCUMENTATION

4.01 Documentation is produced during each TSD phase and should be the natural by-product of the system development process. Documentation is not an end in itself. If a document is not potentially useful to the system developers, users, or project approval bodies, it should not be prepared.

4.02 The three types of documentation associated with TSD phase milestone completion for a system development project are:

(a) Developmental documentation

(b) Deliverable documentation

(c) Project approval documentation.

4.03 ***Developmental Documentation:*** Developmental documentation records the information developed by the system development project team as it proceeds through the TSD activities. In the early phases of TSD, the developmental documentation records the requirements and constraints identified for the system. During the latter TSD phases, the developmental documentation describes the state of the system design at particular points in its development and documents plans for future phase activities. Section 007-227-310, Developmental Documentation Specification, provides recommended specifications for developmental documentation in each TSD phase. The Project Manager can use this section as a guide for planning project documentation.

4.04 The developmental documentation serves as the data base from which information items are drawn for use as parts of deliverable or project approval documents. An important Project Management responsibility is to choose appropriate documentation content and media for a particular project and to control the quality of the documentation produced.

4.05 ***Deliverable Documentation:*** Deliverable documentation is one of the products of the

system development effort and is designed to facilitate the installation, use, and maintenance of the system. Deliverable documents are packaged to meet the needs of specific users, eg, computer center operators, system managers, maintenance supervisors, etc. Deliverable documentation standards are specified in Section 007-230-210, System Deliverable Documentation. This standard provides mandatory deliverable document content and packaging specifications for centrally developed systems. It is also recommended for local development efforts.

4.06 ***Project Approval Documentation:*** Organizations involved in system development usually have a project review function in place to ensure that key system milestones are being met and that the system being designed will meet the requirements specified. The vehicle for such reviews is usually an agreed upon set of documents.

4.07 The developmental documentation can be used as a basis for the project approval documentation. Since the needs of project review groups is usually for overview-type information, some of the developmental documentation may need to be summarized for their use. Detailed cost and schedule information may need to be provided to these review groups in addition to the system related material already available in the developmental documents.